GUJARAT TECHNOLOGICAL UNIVERSITY

7th Semester Civil Engineering - PDDC

Subject Code & Name: X70602 - Dock, Harbour and Airport Engineering

Sr. No.	Course content
A	**Harbour Engineering**
1.	**General:** History, development and policy, harbour and development policy port, classification of harbours, major ports in India, administrative set up, harbour economics,
2.	**Harbour Planning:** Harbour components, ship characteristics, characteristics of good harbour, and principles of harbour planning, size of harbour, site selection criteria and layout of harbours.
3.	**Natural Phenomena:** Wind, waves tides and currents phenomena, their generation characteristics and effects on marine structures, silting, erosion and littoral drift.
4.	**Marine Structures:** General design aspects, breakwaters - function, types general design principles, wharves, quays, jetties, piers, pier heads, dolphin, fenders, mooring accessories- function, types, suitability, design and construction features.
5.	**Docks and Locks:** Tidal basin, wet docks-purpose, design consideration, operation of lock gates and passage, repair docks - graving docks, floating docks, marine railway.
6.	**Port Amenities:** Ferry, transfer bridges, floating landing stages, transit sheds, ware houses, cold storage, aprons, cargo handling equipments, purpose and general description.
7.	**Navigation Aids:** Channel and entrance demarcation, buoys, beacons, light house electronic communication devices.
8.	**Harbour Maintenance:** Costal protection-purpose and devices, dredging-capital and maintenance dredging, purpose, methods, dredgers-types, suitability, disposal of dredged material.
B	**Airport Engineering**
1.	**General:** History, development, policy of air transport, aircrafts, aerodromes, air transport authorities, air transport activities, air crafts and its characteristics, airport classifications.
2.	**Airport Planning :** Regional planning-concepts and advantages, location and planning of airport elements-airfield, terminal area, obstructions, approach zone, zoning laws, airport capacity, airport size and site selection, estimation of future air traffic, development of new airport, requirements of an ideal airport layout.
3.	**Run Way Design:** Wind rose and orientation of runway, factors affecting runway length, basic runway length, corrections to runway length, runway geometrics, and runway patterns (configurations).
4.	**Taxiway Design:** Controlling factors, taxiway geometric elements, layout, exit taxiway, location and geometrics, holding apron, turnaround facility. Aprons - locations, size, gate positions, aircraft parking configurations and parking systems, hanger-site selection, planning and design considerations, Fuel storage area, blast and erosion control.
5.	**Terminal Area Design :** Terminal area elements and requirements, terminal building functions, space requirements, location planning concepts, vehicular parking area and circulation network.
6.	**Grading and Drainage :** Airport grading-importance operations, earthwork computations, airport drainage-aims, functions, special characteristics, basic requirements, surface and subsurface drainage systems.
7.	**Air Traffic Control and Visual Aids :** Air traffic control-objectives, control system, control network-visual aids-landing information system, airport markings and lighting.

Field Visit: Field visits based on course content are suggested.

Reference Books:

1. Port planning, design, operation and maintenance by T. Sinker
2. Docks, harbours and tunnelling by R. Srinivasan
3. Airport Engineering by Rangwala S.C.
4. Airport Engineering by Oza S. P.

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GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–VII EXAMINATION – SUMMER 2016

Subject Code:X70602 Date:12/05/2016

Subject Name: Docks, Harbor and Airport Engineering

Time:02:30 PM to 05:00 PM Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Describe the advantages and disadvantages of water transport.	**07**
	(b)	What is the difference between ports and harbor? Draw the sketch of artificial harbor showing all components.	**07**
Q.2	**(a)**	Define: 1) Free port. 2) Marine terminal. 3) Offshore moorings. 4) Jetty.	**07**
	(b)	What is necessity of dredging? Explain mechanical and hydraulic dredging.	**07**
		OR	
	(b)	Describe wet docks and dry docks. Draw the sketch of gravity dry dock.	**07**
Q.3	**(a)**	Write short note on Wind rose diagram.	**07**
	(b)	What is importance of airport marking and runway marking?	**07**
		OR	
Q.3	**(a)**	What are the factors to be considered in airport planning? Discuss them.	**07**
	(b)	Explain: 1) Pay load and zero fuel weight. 2) Subsonic aircraft and supersonic air craft.	**07**
Q.4	**(a)**	Discuss the importance of grading and drainage in airport.	**07**
	(b)	Discuss the advantages and disadvantages of aviation.	**07**
		OR	
Q.4	**(a)**	Give classification of break water and explain any one.	**07**
	(b)	What are the different types of locks? Discuss any one in detail.	**07**
Q.5	**(a)**	Enlist types of Buoys and explain any one.	**07**
	(b)	Write short note on Light House.	**07**
		OR	
Q.5	**(a)**	Explain procedure for constructing break water.	**07**
	(b)	Write short note on harbor maintenance.	**07**

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GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–VII EXAMINATION – WINTER 2015

Subject Code:X70602 Date:11/12/2015

Subject Name: Dock, Harbour and Airport Eng.

Time: 10:30pm to 1:00pm Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain classification of harbors based on utility	**07**
	(b)	Explain with sketch Breakwaters. Give classification of breakwaters	**07**
Q.2	**(a)**	What is Harbor? Give requirements of good harbor.	**07**
	(b)	Explain water waves and current phenomena	**07**
		OR	
	(b)	Explain the ship characteristics affecting harbor design	**07**
Q.3	**(a)**	Differentiate between jetty and wharf. Stat the condition under which you will prefer their construction.	**07**
	(b)	Classify various types of lock gates and explain working of lock gate.	**07**
		OR	
Q.3	**(a)**	What are navigational aids? Why are they necessary in Harbours?	**07**
	(b)	Draw a neat sketch of an aeroplane and explain its components.	**07**
Q.4	**(a)**	Explain (i) Minimum turning radius (ii) Minimum circling radius (iii) Jet Blast (iv) speed of aircraft.	**07**
	(b)	Explain the data required to be collected for site selection of airport.	**07**
		OR	
Q.4	**(a)**	Write short note on Wind rose diagram	**07**
	(b)	Explain the various factors which affect the layout of taxiway	**07**
Q.5	**(a)**	Explain airport lighting	**07**
	(b)	What is terminal area? What facilities are provided in this area?	**07**
		OR	
Q.5	**(a)**	Explain the method for protection from jet blast.	**07**
	(b)	Explain the necessity of airport drainage. What are its special characteristics?	**07**

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GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC – SEMESTER VII– • EXAMINATION – SUMMER-15

Subject Code:X70602 **Date:**12/**05/2015**

Subject Name: DOCKS, HARBOURS AND AIRPORTS

Time: 02:30 pm - 05:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Give the advantages and disadvantages of air transport. What is the difference Between balloon and aero plane?	**07**
	(b)	Explain by drawing sketch width, height and length of aircrafts.	**07**
Q.2	**(a)**	What are the factors affecting site selection of airports	**07**
	(b)	Explain wind coverage and crosswind component. draw the sketch of wind-rose Diagram type I (direction and duration)	**07**
		OR	
	(b)	Draw the sketch of any artificial harbors showing all components	**07**
Q.3	**(a)**	What are the different agencies involved in administration of sea ports at National level?	**07**
	(b)	What are the functions of National Airport Authority(NAA) and International Civil Aviation Organization (ICAO)	**07**
		OR	
Q.3		The required length of runway under standard atmospheric conditions is 1950m. The airport site is 1100.0m above mean sea level. the airport reference temperature is 16°c, the max gradient is 0.45% determine required design Length of runway.	**14**
Q.4	**(a)**	Explain by drawing sketch mound type breakwater and vertical wall breakwater	**07**
	(b)	What is the use of dry docks? Draw the sketch of graving dry dock.	**07**
		OR	
Q.4	**(a)**	How the water waves are formed? Explain by drawing sketch deep waves and Shallow waves.	**07**
	(b)	What is necessity of dredging in marine works? Draw the sketch of bucket Ladder dredger	**07**
Q.5	**(a)**	What is the use of fenders on docking platforms? Describe wooden fenders	**07**
	(b)	Give the list of major ports in India,	**07**
		OR	
Q.5	**(a)**	Define:- (i) Offshore mooring(ii) tides (iii) jetties and piers (iv) transit shed (v) light house (vi) port (vii) cargo ship	**07**
	(b)	What is the necessity of lock gates? Draw the sketch of lock gate.	**07**

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GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–VII • EXAMINATION – WINTER • 2014

Subject Code: X 70602 Date: 01-12--2014

Subject Name: Dock, Harbour and Airport Engineering

Time: 10:30 am - 01:00 pm Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	What are the advantages and dis advantages of water transportation?	**07**
	(b)	Explain the following with sketch. 1. Natural Harbour 2. Littoral drift 3. Tidal datum	**07**
Q.2	**(a)**	Write a short note on "Tetra pods and Tri bars"	**07**
	(b)	Enlist the method of construction of Mound. Explain any one with sketch.	**07**
		OR	
	(b)	Explain the functions of the followings: 1. Quay walls 2. Jetties 3. Wharf	**07**
Q.3	**(a)**	Write a short note on "Floating dock".	**07**
	(b)	Enlist the various types of Navigational Aids. Explain any one with sketch.	**07**
		OR	
Q.3	**(a)**	Enlist the different types of dredgers. Explain dipper dredger with sketch.	**07**
	(b)	Explain about the ship characteristics.	**07**
Q.4	**(a)**	Draw a sketch of aircraft with their parts. Explain the functions of each part.	**07**
	(b)	What are the points to be considered for selection of airport? Explain.	**07**
		OR	
Q.4	**(a)**	Explain the imaginary surfaces of the airport.	**07**
	(b)	Explain the factors affecting runway orientation.	**07**
Q.5	**(a)**	Write a short note on "Blast fences in Apron area" .	**07**
	(b)	What are the requirements of good hangar site?	**07**
		OR	
Q.5	**(a)**	Enlist various types of visual aids in the Airport. Explain any two with sketch.	**07**
	(b)	Briefly explain about the Wind Rose diagram.	**07**

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GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–VII • EXAMINATION – SUMMER 2014

Subject Code: X70602 Date: 30-05-2014

Subject Name: Dock, Harbour and Airport Engineering

Time: 02.30 pm - 05.00 pm Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Classify the various type of airport.	**07**
	(b)	What are the types of imaginary surface? Describe with sketch.	**07**
Q.2	**(a)**	What is wind rose diagram? Explain the types with its utility.	**07**
	(b)	Explain the types of corrections to be applied for basic run way length.	**07**
		OR	
	(b)	What are the factors affecting runway capacity? Explain.	**07**
Q.3	**(a)**	How is the provision of parking of vehicles made at the airport?	**07**
	(b)	Differentiate between runway marking and shoulder marking.	**07**
		OR	
Q.3	**(a)**	Explain wings, propeller, jet blast.	**07**
	(b)	Explain the significance of air transportation compare to other modes of transportation.	**07**
Q.4	**(a)**	Explain methods of mound construction.	**07**
	(b)	Write short note on Chennai port.	**07**
		OR	
Q.4	**(a)**	What do you understand by repair docks? Explain types of repair docks.	**07**
	(b)	What are the advantage and disadvantage of water transportation?	**07**
Q.5	**(a)**	Explain with sketch about wharf and jetties.	**07**
	(b)	What are the floating docks? Give advantage and dis advantages.	**07**
		OR	
Q.5	**(a)**	Explain about the transit sheds with sketch.	**07**
	(b)	Enlist the types of dredges. Explain any one with sketch.	**07**

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GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–VII • EXAMINATION – WINTER 2013

Subject Code: X70602 Date: 05-12-2013

Subject Name: Dock, Harbour and Airport Engineering

Time: 10.30 am - 01.00 pm Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain the components parts of an aeroplane with neat sketch.	**07**
	(b)	Write a short note on "Wind rose diagram"	**07**
Q.2	**(a)**	Calculate the actual length of the runway from the following data Airport elevation – RL 150 m Airport reference temperature - 30^0C Basic runway length – 800 m Highest point along the length – RL 148 m Lowest point along the length – RL 146 m	**07**
	(b)	Discuss the four basic pattern of the runways.	**07**
		OR	
	(b)	Describe the various system of the aircraft parking.	**07**
Q.3	**(a)**	Write a short note on "Taxiway marking"	**07**
	(b)	What are the factors affecting airport lighting? Explain	**07**
		OR	
Q.3	**(a)**	Explain various types of imaginary surfaces.	**07**
	(b)	Explain the functions of Airport authority of India.	**07**
Q.4	**(a)**	Define – Neap tide, spring tides, Diurnal tides, Tidal range, Ballast, Displacement load, Harbour	**07**
	(b)	Classify the different types of breakwaters. Under what condition a rubble mound breakwater is preferred?	**07**
		OR	
Q.4	**(a)**	Write a short note on "Dolphins and Quay"	**07**
	(b)	Describe the construction procedure of mounds.	**07**
Q.5	**(a)**	Write a short note on "Mumbai port"	**07**
	(b)	Explain the difference between Dry dock and wet dock.	**07**
		OR	
Q.5	**(a)**	Enlist the type of dredger. Describe the function of each types of dredger.	**07**
	(b)	Write a short note on "Tetrapods".	**07**

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PDDC - SEMESTER–VII • EXAMINATION – SUMMER 2013

Subject Code: X70602 Date: 14-05-2013

Subject Name: Dock, Harbour and Airport Engg.

Time: 10.30 pm - 01.00 pm Total Marks: 70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Distinguish between Natural and Artificial harbour with sketch.	**07**
	(b)	What are the requirements of good harbour?	**07**
Q.2	**(a)**	Explain – Littoral drift, Spring tide, Neap tide, Fetch.	**07**
	(b)	What are dolphins? Explain their types.	**07**
		OR	
	(b)	Briefly explain the methods of mound construction.	**07**
Q.3	**(a)**	Enlist the types of Dredging devices. Explain any one with sketch.	**07**
	(b)	What is mooring? Explain the accessories of Floating and fixed types moorings.	**07**
		OR	
Q.3	**(a)**	What are the factors affecting Airport Capacity?	**07**
	(b)	What are the characteristics of conventional air craft?	**07**
Q.4	**(a)**	Explain the methods adopted for protection from jet blast with sketch.	**07**
	(b)	What are the objectives of surface drainage at an airport?	**07**
		OR	
Q.4	**(a)**	How is the provision of parking of vehicles made at the airport?	**07**
	(b)	Write a short note on “Balanced Field Concept”.	**07**
Q.5	**(a)**	Explain the types of Runway pattern with neat sketch.	**07**
	(b)	Differentiate between (i) Runway and Taxiway (ii) Loading apron and Holding bays	**07**
		OR	
Q.5	**(a)**	Explain the procedure for constructing Wind rose diagram.	**07**
	(b)	Write a short note on “Visual aids”.	**07**

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GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER – VII • EXAMINATION – WINTER 2012

Subject code: X 70602 **Date: 27/12/2012**

Subject Name: Dock, Harbour and Airport

Time: 10.30 am - 01.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain the classification of Harbour with neat ketch.	**07**
	(b)	Explain : (i) Littoral drift (ii) Neap tide (iii) Spring tide (iv) Fetch	**07**
Q.2	**(a)**	What are the Special Breakwaters? Explain with sketch.	**07**
	(b)	What are Dolphins? Describe their types.	**07**
		OR	
	(b)	Explain the methods of constructing Mound Breakwater"	**07**
Q.3	**(a)**	Write a short note on (i) Light house (ii) Transit sheds	**07**
	(b)	Explain various types of Floating docks.	**07**
		OR	
Q.3	**(a)**	Explain various component parts of Aeroplane with sketch.	**07**
	(b)	Explain the classification of Airports.	**07**
Q.4	**(a)**	Explain the utility of Wind rose diagram.	**07**
	(b)	What are the geometric elements of Runway? Explain	**07**
		OR	
Q.4	**(a)**	An airport is proposed at an elevation of 300 m above the mean sea level. The mean of maximum and mean of average daily temperature in summer month are 43^0 C and 28^0 C respectively. The difference in elevation at the proposed site is 5 m. If the basic runway is 1100 m, calculate the actual length of runway to be provided.	**07**
	(b)	Explain the meaning of balanced field concept.	**07**
Q.5	**(a)**	Explain the Runway pattern with sketch.	**07**
	(b)	Write a short note on "Devices to protect from Jet Blast"	**07**
		OR	
Q.5	**(a)**	Write a short note on (i) Threshold Marking (ii) Runway Marking	**07**
	(b)	What is the function of Hangar? What are its types?	**07**

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